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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the image forming device provided with the heating apparatus and this heating apparatus of an electromagnetism (magnetism) induction heating system as image heating devices, such as image fixing.
[0002]
[Description of the Prior Art]For convenience, the picture heat fixing device in image forming devices, such as an electro photography copying machine and printer fax, is made into an example, and is explained.
[0003]In the imaging part of an image forming device, the picture heat fixing device in an image forming device by proper image formation process means, such as electro photography, electrostatic recording, and magnetic recording. It is a device which carries out heat fixing processing of the toner image which is not established [which was formed in the field of a recording material by the direct method or the indirect (transfer) method using the toner (toner) which consists of resin of heat melting nature, etc.] as a permanent fixed image at a record material surface.
[0004]Conventionally, there are various devices, such as a heat mechanical control by roller, a film heating method, and an electromagnetic induction heating system, as such a picture heat fixing device.
[0005]a. a heat mechanical control by roller -- this making the heat source of a halogen lamp etc. build in, becoming predetermined fixing temperature from heating and the rotary roller pair of the fixing roller (heat roller) and pressurizing roller which carried out temperature control, and, It is a device which carries out heat fixing of the unestablished toner image to a record material surface by introducing into the pressure welding nip part (fixation nip part) of this roller pair the recording material which carried out formation support of the unestablished toner image as a heating material, and carrying out pinching conveyance.
[0006]However, there were problems, like waiting time (waiting time until it will be in a print output possible state from the device power injection time) is long with calorific capacity of a fixing roller large [this device] and large electric power which heating takes.
[0007]In the case of the anchorage device for full color image forming devices, In order for a fixing roller to make the rodding what has high calorific capacity, and to wrap in a toner layer, since the capability to which heat melting of the toner layer of a maximum of four layers is carried out enough is required, and to fuse uniformly, a rodding periphery is made to possess rubber elastic layer, and the toner image is heated via this rubber elastic layer. Thus, in the case of the device using a fixing roller especially with big calorific capacity, since delay occurred in the temperature control of this fixing roller, and the temperature up of a roller surface, problems, such as a fixing defect, gloss nonuniformity, and offset, had occurred.
[0008]b. a film heating method -- this a heating body and the film on which one field slides with this heating body and which the field of another side moves in contact with a recording material, [have and] It is a device which gives the heat of a heating body to a recording material via a film, and carries out heat fixing processing of the unestablished toner image at a record material surface (JP,63-313182,A, JP,2-157878,A, and JP,4-44075,A -44083, the No. 204980-204984 gazette, etc.).

[0009]The device of such a film heating method as a heating body the ceramic heater of low-fever capacity, etc., the thing of thin low-fever capacity can be used with heat resistance as a film, compared with the device of a heat mechanical control by roller using a fixing roller with large calorific capacity, it is markedly alike, power-saving and waiting time shortening are attained, and there is quick start nature, and there is an advantage of being able to suppress temperature up inside the plane.

[0010]c. an electromagnetic induction heating system -- this, using an electromagnetic induction exothermic body as a heating body, the eddy current which a magnetic field is made to act on this electromagnetic induction exothermic body by a magnetic field generating means, and is generated in this electromagnetic induction exothermic body -- a basis -- it is a device which gives heat to the recording material as a heating material by **** joule generation of heat, and carries out heat fixing processing of the unestablished toner image at a record material surface.

[0011]The device of the heat mechanical control by roller which carries out electromagnetic induction heating of the fixing roller of a ferromagnetic is indicated by JP,5-9027,B, the exothermic position could be made close to a fixation nip part, and the fixing process more efficient than the device of a heat mechanical control by roller using the halogen lamp as a heat source is attained.

[0012]However, in order to raise the temperature of a fixation nip part with the electric power limited since the calorific capacity of a fixing roller was large, there was a problem of needing big electric power.

[0013]The anchorage device of the electromagnetic induction heating system using the fixing roller of the film state which reduced calorific capacity is indicated by JP,4-166966,A.

[0014]However, in the fixing roller of the film state which reduced calorific capacity. Since the heat flow rate of the direction of a long picture (fixation nip part longitudinal direction) was checked, when a small size recording material was ****(ed), the overheating (non-paper-feed-section temperature up) in the non-paper-feed-section occurred, and the problem of reducing the life of a film or a pressurizing roller had occurred. The same of the problem of this non-paper-feed-section temperature up may be said of the case of the device of the film heating method of said b paragraph.

[0015]

[Problem(s) to be Solved by the Invention]Therefore, as a picture heat fixing device of an image forming device, The overheating in a non-paper-feed-section which is low power consumption and which can shorten waiting time is prevented, and, [in which high-durability-izing is possible] The heating apparatus having the performances, such as having a fixing defect, gloss nonuniformity, and the high performance that offset does not generate, which can be used as an anchorage device in a full color image forming device is demanded.

[0016]This invention provides the device using the heating apparatus of the electromagnetic heating method which can meet such a request, and this heating apparatus.

[0017]

[Means for Solving the Problem]This invention is heating apparatus and an image forming device which are characterized by the following composition.

[0018](1) It has an induction heating element which carries out electromagnetic induction generation of heat by operation of generating magnetic flux of a magnetic flux generation means and this magnetic flux generation means, It is heating apparatus of an electromagnetic induction heating system which introduces a heating material into a heating unit, makes said induction heating element contact via direct or a heat transfer material, makes it convey, and heats a heating material by generation of heat of an induction heating element, Heating apparatus having a magnetic flux adjustment means to which density distribution about the direction of a heating unit long picture which intersects a transportation direction of a heating material of acting magnetic flux to an induction heating element is made to change from a magnetic flux generation means in a heating unit.

[0019](2) Heating apparatus given in (1), wherein an induction heating element is a solid of revolution.

[0020](3) Heating apparatus given in (2), wherein a rotation induction heating element consists of a

seamless film of small calorific capacity.
[0021](4) Heating apparatus of any one statement of (1) which has a rotary pressurizing member which contacts an induction heating element via direct or a heat transfer material in a heating unit, and forms a heating material pinching carrying nip part thru/or the (3).
[0022](5) A magnetic flux adjustment means, a device -- ****, when a heating material of size smaller than a heating material of the usable maximum size is ****(ed). Heating apparatus of any one statement of (1) thru/or the (4) weakening acting-magnetic-flux density to an induction heating element portion corresponding to non-**** region sections of ******** rather than acting-magnetic-flux density to an induction heating element portion corresponding to **** region sections.
[0023](6) Heating apparatus of any one statement of (1) thru/or the (5), wherein a magnetic flux adjustment means functions on a device according to size of a heating material by which **** use is carried out.
[0024](7) Heating apparatus of any one statement of (1) thru/or the (6), wherein a magnetic flux adjustment means is a movable magnetic flux shielding member.
[0025](8) Heating apparatus of any one statement of (1) thru/or the (6), wherein a magnetic flux adjustment means is a magnetic member by which insertion-and-detachment movement is carried out at a magnetic flux generation means.
[0026](9) Heating apparatus of any one statement of (1) thru/or the (6), wherein a magnetic flux adjustment means is the magnetic flux attenuation coil attached to a magnetic flux generation means.
[0027](10) A magnetic flux adjustment means is the magnetic flux attenuation coil attached to a magnetic flux generation means, Heating apparatus of any one statement of (1) thru/or the (6) weakening generating magnetic flux density in a portion corresponding to this attenuation coil of a magnetic flux generation means by making an induced current produced in this attenuation coil consume in a load circuit.
[0028](11) Heating apparatus of any one statement of (1) thru/or the (10) a heating material's being a recording material which made a picture support, and being an image heating device which heat-treats this picture.
[0029](12) Heating apparatus given in (11) being a picture heat fixing device to which a recording material is made to carry out heat fixing of the picture as a permanent image.
[0030](13) An image forming device equipping the above (11) with an image heating device of a statement, or a picture heat fixing device given in (12).
[0031]<** **> by a magnetic flux adjustment means. a device -- **** -- by making it change so that acting-magnetic-flux density to an induction heating element portion corresponding to non-**** region sections of a heating unit when a heating material of size smaller than a heating material of the usable maximum size is ****(ed) may be weakened rather than acting-magnetic-flux density to an induction heating element portion corresponding to **** region sections. Overheating (non-paper-feed-section temperature up) in a non-paper-feed-section can be prevented or eased, and high durability-ization of a device is attained.
[0032]A heating unit can be promptly started to a temperature predetermined with low power consumption by using as a member of small calorific capacity a member containing an induction heating body or an induction heating body and a heat transfer material, and it is possible to make shortening of waiting time and quick start nature provide.
[0033]It becomes possible to constitute heating apparatus which can be used as an anchorage device in a full color image forming device and which has a fixing defect, gloss nonuniformity, and the high performance that offset does not generate.
[0034]
[Embodiment of the Invention]
<The example 1 of an embodiment> (drawing 1 - drawing 6)
(1) Example drawing 1 of an image forming device is an outline lineblock diagram of an example of an image forming device. The image forming device of this example is an electro photography 4 color color printer.

[0035]11 is the electro photography photo conductor drum (image support) made with the organic photoreceptor, and is rotated with the predetermined process speed (peripheral velocity) of an arrow clockwise.
[0036]The photo conductor drum 11 receives charging processing with uniform predetermined polarity and potential with the electrification units 12, such as a charged roller, by the rotation process.
[0037]Subsequently, scanning exposure processing of picture information to be based on laser beam L outputted to the charging processing side from the laser optics box (laser scanner) 13 is received. The laser optics box 13 is what outputs laser beam L modulated corresponding to the time series electrical-and-electric-equipment digital pixel signal of the target image information from picture signal generators, such as an unillustrated image reader (ON and OFF), and carries out scanning exposure of the rotation photo conductor side, The electrostatic latent image corresponding to the target image information which carried out scanning exposure to the 11th page of the rotation photo conductor drum by this scanning exposure is formed. 13a is a mirror which makes the exposure position of the photo conductor drum 11 deflect the output laser beam from the laser optics box 13.

[0038]In the case of full color image formation, the scanning exposure and latent image formation about the 1st target color separation ingredient picture, for example, yellow ingredient picture, of a full color image are made, and the latent image is developed as a yellow toner image by the operation of the yellow development counter 14Y of the 4 color color developers 14. The yellow toner image is transferred by the field of the intermediate transfer body drum 16 in the primary transfer part T1 which is a contact portion (or proximity part) of the photo conductor drum 11 and the intermediate transfer body drum 16. The 11th page of the rotation photo conductor drum after the toner image transfer to the 16th page of an intermediate transfer body drum is cleaned by the cleaner 17 in response to removal of adhesion residues, such as the transfer remaining toner.
[0039]The above process cycles of electrification, scanning exposure, development, primarily transferring, and cleaning, The 2nd of the target full color image (a magenta ingredient picture and the magenta development counter 14M operate), the 3rd (a cyanogen ingredient picture and the cyanogen development counter 14C operate) and the 4th (for example, a black ingredient picture.) Black development counter 14BK is performed one by one about each color separation ingredient picture of an operation, The toner image of convenience 4 color of a yellow toner image, a magenta toner image, a cyanogen toner image, and a black toner image is transferred one by one by the 16th page of the intermediate transfer body drum in piles, and synthetic formation of the color picture corresponding to the target full color image is carried out.
[0040]The intermediate transfer body drum 16 is what has an elastic layer of middle resistance, and a surface of high resistance in metal drum lifting, contacting the photo conductor drum 11 or approaching -- the photo conductor drum 11 -- abbreviated -- it rotates in the direction of half:00 meter of an arrow with the same peripheral velocity, bias potential is given to a metal drum, and the toner image by the side of the photo conductor drum 11 is made to transfer to this intermediate transfer body drum surface side by potential difference with the photo conductor drum 11
[0041]The color toner image by which synthetic formation was carried out to the 16th page of the above-mentioned rotation intermediate transfer body drum, It is transferred by the field of the recording material P sent into this secondary transfer part T2 from the unillustrated feeding part to predetermined timing in the secondary transfer part T2 which is a contact nip part of this rotation intermediate transfer body drum 16 and the transfer roller 15. The transfer roller 15 carries out package transfer of the synthetic color toner image from the 16th page of intermediate transfer body drum side one by one to the recording material P side by supplying the electric charge of a toner and reverse polarity from the back of the recording material P.
[0042]It dissociates from the field of the intermediate transfer body drum 16, and the recording material P which passed the secondary transfer part T2 is introduced to the picture heat fixing device 10, and is discharged as a color picture form product in response to heat fixing processing of an unestablished toner image by the paper output tray which is not illustrated [outside the plane].
[0043]The picture heat fixing device 10 is a device of the electromagnetic induction heating system

according to this invention. This anchorage device 10 is explained in full detail by the following (2) paragraphs.

[0044]The rotation intermediate transfer body drum 16 after the color toner image transfer to the recording material P is cleaned by the cleaner 18 in response to removal of adhesion residues, such as the transfer remaining toner and paper powder. This cleaner 18 is held at the noncontact state at the intermediate transfer body drum 16, and is always held at a contact state at the intermediate transfer body drum 16 in the secondary transfer execution process of a color toner image over the recording material P from the intermediate transfer body drum 16.

[0045]The transfer roller 15 is also held at the noncontact state at the intermediate transfer body drum 16, and is always held via the recording material P at a contact state at the intermediate transfer body drum 16 in the secondary transfer execution process of a color toner image over the recording material P from the intermediate transfer body drum 16.

[0046](2) As for picture heat fixing device 10 drawing 2 and drawing 3, the vertical section transverse-plane model figure of a heating assembly and drawing 5 of the partial notch side model figure of the picture heat fixing device 10 and drawing 4 are the notch perspective views of a heating assembly.

[0047]This anchorage device 10 makes the pressurizing roller 2 as a rotary pressurizing member the heating assembly 1 with a subject.

[0048]. Attached the heating assembly 1 outside the cylindrical film guide member 3 among those the exiting coil 4 as a magnetic flux generation means allocated in empty and the magnetic core (high transmissivity core) 5, and the cylindrical film guide member 3 loosely. It consists of circular magnetic flux shield 7.7 grade of the right-and-left couple as a magnetic flux adjustment means allocated in sliding direction a-b at slide movement freedom in accordance with the inner surface circumference by the side of the cylindrical shape (seamless) fixing film 6 as an induction heating element, and the end of the cylindrical film guide member 3.

[0049]The pressurizing roller 2 is an elastic roller which consists of silicone rubber layer 2b of the 2-mm thickness which made the periphery of the rodding 2a and this rodding cover.

[0050]Make the above-mentioned heating assembly 1 and pressurizing roller 2 of each other weld by pressure up and down, and they are built into unillustrated device casing, Fixation nip part (heating nip part) N of prescribed width is made to have formed among both 1-2, and the inner surface of the fixing film 1 is stuck to the undersurface of the cylindrical film guide member 3 in this fixation nip part N.

[0051]In drawing 2, an arrow rotates the pressurizing roller 2 clockwise by the driving means M, Torque acts on the fixing film 5 by the frictional force in fixation nip part N of this roller 2 by rotation of this pressurizing roller 2, and the outside surface of the fixing film 6, The fixing film 6 rotates an area around of the cylindrical film guide member 3 to the counterclockwise rotation of an arrow, while the inner surface carries out adhesion sliding in fixation nip part N on the undersurface of the cylindrical film guide member 3.

[0052]The exiting coil 4 generates alternate magnetic flux according to the alternating current supplied from the exciting circuit 40 (drawing 5), and alternate magnetic flux is led to the magnetic core 5, acts on fixation nip part N, and makes the electromagnetic induction exothermic layer which the fixing film 6 mentions later in fixation nip part N generate an eddy current. The eddy current generates Joule heat with the specific resistance of an electromagnetic induction exothermic layer. That is, in fixation nip part N, the fixing film 6 will be in the electromagnetic induction febrile state by supplying an alternating current to the exiting coil 4.

[0053]Temperature control control of the temperature of fixation nip part N is carried out at predetermined fixing temperature by the supply alternating current from the exciting circuit 30 to the exiting coil 4 being controlled by the temperature control system 100 including an unillustrated temperature detecting means.

[0054]In the state where **(ed), rotation of the fixing film 6 by rotation of the pressurizing roller 2 was made, supply of the alternating current from the exciting circuit 40 to the exiting coil 4 was made, and temperature control of the temperature of fixation nip part N was risen and carried out to predetermined, By the recording material P which supported unestablished toner image t as a

heating material being introduced between the rotation fixing film 6 of fixation nip part N, and the pressurizing roller 2. The recording material P is stuck to the outside surface of the fixing film 6, fixation nip part N is passed together with this fixing film 6, it is this fixation nip part passage process, the recording material P and unestablished toner image t are heated by generation of heat of the fixing film 6 by which electromagnetic induction heating was carried out, and the heat fixing of a toner image is made. By the outlet side of fixation nip part N, it dissociates from the outside surface of the fixing film 6, and the recording material P which passed along fixation nip part N is conveyed.

[0055]a. In the heating assembly 1 the cylindrical film guide member 3, It is the insulation and the heat-resistant member which does not bar passage of magnetic flux, and the duty which guides the inner surface of the cylindrical fixing film 6 which both rotates the outside of this member 2 which supports the exiting coil 4 and the magnetic core 5, and secures the stability of rotation of the fixing film 6 is carried out.

[0056]b. The exiting coil 4 of this example comes to carry out winding shaping of the outside shape at the oblong boat form made to abbreviated-correspond to the inner surface of the cylindrical film guide member 3 using a pre-insulation electric wire, makes an outside surface received in the abbreviated lower half plane part of the inner surface of the cylindrical film guide member 3, and insertion allocation has been carried out into the cylindrical film guide member 3. Although alternate magnetic flux sufficient as the exiting coil 4 for heating is generated, it is necessary to take a resistance component low a high inductance component for that purpose. Using the pre-insulation electric wire of phi 1 for high frequency which bundled the small-gage wire as a core wire, it wound 12 times and the exiting coil 4 consisted of these examples so that fixation nip part N might be gone around. The exciting circuit 30 is connected to this exiting coil 4, and this exciting circuit 40 can supply a 50-kHz alternating current now to the exiting coil 4.

[0057]c. The magnetic core 5 is an oblong ferrite core, and locate it in the abbreviated center section of the exiting coil 4 of an oblong boat form, and the cylindrical film guide member 3 is made to support it, and it is allocated. This magnetic core 5 carries out the duty which raises efficiently the alternate magnetic flux generated from the exiting coil 4 by fixation nip part N.

[0058]d. The fixing film 6 is a cylindrical member containing an electromagnetic induction exothermic layer, has made the inside diameter somewhat larger than the outer diameter of the cylindrical film guide member 3, and attaches it outside the cylindrical film guide member 3 loosely.

[0059](a) of drawing 6 is a lamination model figure of this fixing film 6. The fixing film 6 of this example is the composite layer composition of three-layer lamination of the releasing layer (surface; pressurizing roller 2 side) 6c of the outside further with the inside (film guide member 3 side) electromagnetic induction exothermic layer 6a and the elastic layer 6b of the outside. Heat transfer of the heat of the electromagnetic induction exothermic layer 6a is carried out to the recording material P conveyed by fixation nip part N via elastic layer 6b and the releasing layer 6c, and toner image t on the recording material P and this recording material is heated.

[0060]The exothermic layer 6a is a construction material layer which has the electromagnetic induction febrility which produces Joule heat in the eddy current by operation of alternate magnetic flux, What is necessary is just the metal, the metallic compounds, and the organic conductor which are electric good conductors of 10^{-5} - 10^{-10} omega-cm, such as nickel, and pure metals or those compounds, such as iron, cobalt, etc. in which more desirable ferromagnetism with high amplitude permeability is shown, can be used.

[0061]This exothermic layer 6a has the tendency for it to become impossible to secure sufficient magnetic path when thickness is made thin, and for magnetic flux to leak to the exterior, and for the time which calorific capacity will become large and temperature up will take to it if it may become small [an exothermic layer's own exothermic energy] and thickens to become long. Therefore, with the value of the specific heat, the density, amplitude permeability, and resistivity of the material used for the exothermic layer 6a, thickness has an appropriate value and was able to obtain the heating rate of not less than 3 **/sec in the thickness range which is 10-100 micrometers in practice.

[0062]The elastic layers 6b are rubber layers, such as silicone rubber, and they are provided in order

to make good fixing of the color toner image which consists of a toner layer of a maximum of four layers in this example, and they carry out the operation which wraps in a toner image with the elasticity of this layer and to which melting is carried out uniformly.

[0063]If this elastic layer 6b has too high hardness, it will not be able to follow unevenness of a recording material or a toner layer, and image gloss nonuniformity will generate it. Then, as hardness of the elastic layer 6b, 45 degrees or less are preferably good below 60 degrees (JIS-A).

[0064]It is related with the thermal conductivity lambda of the elastic layer 6b, and they are $6x10^{-4}$ - $2x10^{-3}$ [cal/cm-sec-deg.]. It is good. The thermal conductivity lambda is $6x10^{-4}$ [cal/cm-sec-deg.]. In being small, thermal resistance is large and the heating rate in a fixing film surface becomes slow.

[0065]When 100-300 micrometers is preferred as for the thickness of this elastic layer 6b and are smaller than 100 micrometers, like a color image forming device when there are many rates of a solid picture, It is easy to generate punctate gloss nonuniformity, and if it exceeds 300 micrometers, a heat gradient will occur and it will be easy to generate the heat deterioration of an elastic layer between the surface and the exothermic layer 6a.

[0066]The releasing layer 6c can prevent adhesion of the toner on the surface of a fixing film, and can choose a good material of the mold-release characteristic of fluoro-resins, such as PFA-PTFE-FEP, silicone resin, silicone rubber, fluorocarbon rubber, etc., and heat resistance.

[0067]The problem that the bad portion of a mold-release characteristic will be made with the ** nonuniformity of a coat if 20-100 micrometers is preferred and smaller than 20 micrometers, or endurance runs short generates thickness. If it exceeds 100 micrometers, the problem that heat conduction gets worse will occur, when it is especially a releasing layer of a resin system, hardness will become high too much and the effect of the elastic layer 6b will be lost.

[0068]The fixing film 6 used for this example is a three-layer composite layer film which consists of the exothermic layer 6a with a thickness of 50 micrometers which consists of nickel, the elastic layer 6b with a thickness of 200 micrometers which consists of silicone rubber, and the releasing layer 6c with a thickness of 30 micrometers which consists of fluoro-resins.

[0069]As shown in (b) of drawing 6, it is good also as the fixing film 6 of 4 lamination which provided 6 d of thermal breaks inside the exothermic layer 6a in the above-mentioned lamination of the fixing film 6. 6 d of thermal breaks have good heat-resistant resin, such as a fluoro-resin, polyimide resin, polyamide resin, polyamide imide resin, PEEK resin, PES resin, PPS resin, PFA resin, PTFE resin, and an FEP resin. As thickness, 10-1000 micrometers is preferred. When thickness is smaller than 10 micrometers, adiabatic efficiency is not acquired, and endurance also runs short. When it exceeds 1000 micrometers, the distance of the magnetic core 5 to the exothermic layer 6a becomes large, and magnetic flux stops fully reaching the exothermic layer 6a. Since the temperature up of the exiting coil 4 by the heat generated in the exothermic layer 6a or the magnetic core 5 can be prevented when 6 d of thermal breaks are provided, stable heating can be carried out.

[0070]e. The circular magnetic flux shields 7 and 7 of the right-and-left couple allocated in sliding direction a-b at slide movement freedom in accordance with the inner surface circumference by the side of the end of the cylindrical film guide member 3, In the case where **** use of the recording material of small size is carried out, the operation density of the alternate magnetic flux to the non-**** region sections of fixation nip part N is lowered rather than the operation density of the magnetic flux over **** region sections, and the duty which prevents or eases a non-paper-feed-section temperature-up phenomenon is carried out. As these magnetic flux shields 7 and 7, the nonmagnetic electric good conductor of alm NIUMU, copper, etc. is preferred.

[0071]In this example, introduction of the recording material P to the anchorage device 10 is made by one-side-criterion ****. In drawing 4 and drawing 5, O is non-**** region sections (A-B) when the **** region sections of a large size recording material (device **** usable maximum size recording material) carry out a single-sided **** base line and A, the **** region sections of a small size recording material are carried out as for B and **** use of the small size recording material is carried out as for C.

[0072]The circular magnetic flux shields 7 and 7 of the above-mentioned right-and-left couple, It has inserted in the circumferencial direction guide groove 3a provided in the end inner surface of the side which produces the above-mentioned non-**** region sections C of the cylindrical film

guide member 3, In the right-and-left side of the magnetic core 5, along with the circumferencial direction guide groove 3a, it is slide movement freedom and has the width corresponding to the width of the non-**** region sections C at sliding direction a-b, respectively.

[0073]And it will be inserted like drawing 2 by slide movement being carried out to the lower part b, respectively between the right-and-left outside surface of the exiting coil 4, and the inner surface of the cylindrical film guide member 3 (closing place).

[0074]Will be escaped from and come out from between the right-and-left outside surface of the exiting coil 4, and the inner surfaces of the cylindrical film guide member 3 to the upper part a like drawing 3 by slide movement being carried out, respectively (opening position).

[0075]** . when the magnetic flux shields 7 and 7 are in the closing place of drawing 2, About the direction of a long picture of fixation nip part N (longitudinal direction), The alternate magnetic flux from the exiting coil 4 to the non-**** region sections C when a small size recording material is ****(ed) is intercepted or reduced between the fixing films 6 by these closed magnetic flux shields 7 and 7, and the operation density of magnetic flux can lower it rather than the operation density of the magnetic flux over the small size **** region sections B of fixation nip part N.As a result, although the fixing film portion corresponding to the small size **** region sections B in a fixation nip part carries out electromagnetic induction generation of heat almost uniformly and serves as the optimal temperature distribution for fixing predetermined, Electromagnetic induction generation of heat of the fixing film portion corresponding to the non-**** region sections C is falling rather than it, and prevention or relaxation of a non-paper-feed-section temperature-up phenomenon is made.

[0076]** . when the magnetic flux shields 7 and 7 are in the opening position of drawing 3, The magnetic flux cover by these magnetic flux shields 7 and 7 is not made, but the alternate magnetic flux generated with the exiting coil 4 continues throughout the large size **** region sections A in a fixation nip part, and acts by high predetermined density, The fixing film partial whole region corresponding to the large size **** region sections A in a fixation nip part carries out electromagnetic induction generation of heat almost uniformly, and serves as the optimal temperature distribution for fixing predetermined.

[0077]The magnetic flux shields 7 and 7 pass the arm parts 7a and 7a, respectively, and are the driving means 70 (drawing 4 is made to have connected with, it changes to a closing place and an opening position, and movement is automatically made by the device by the control circuit 101 and the driving means 70 according to the size of the recording material by which **** use is carried out.). Although the concrete constructional example of the driving means 70 which carries out open closing of the magnetic flux shields 7 and 7 was omitted to the figure, it can design and consist of suitably and easily driving sources, such as a motor and a solenoid, and a movement mechanism by a lever link cam belt etc.

[0078]The control circuit 101 controls the driving means 70 to change the magnetic flux shields 7 and 7 to the closing place of drawing 2, and to make it move, when detected by the device by a cognitive means by which it does not illustrate [be / the recording material P by which **** use is carried out / small size]. Prevention or relaxation of a non-paper-feed-section temperature-up phenomenon is made by change like the above-mentioned ** to the closing place of these magnetic flux shields 7 and 7.

[0079]The control circuit 101 controls the driving means 70 to change the magnetic flux shields 7 and 7 to the opening position of drawing 3, and to make it move to it, when the recording material P by which **** use is carried out was large size and it is detected by the device by a cognitive means. Without being barred, the magnetic flux which reaches a fixing film about the direction of a long picture of a fixation nip part like the above-mentioned ** by this carries out all-over-the-districts generation of heat, and serves as the optimal temperature distribution for fixing of the recording material of large size.

[0080]The image forming device of the above-mentioned (1) has the feature which can respond to various recording materials by adoption of the intermediate transfer body drum 16. In the correspondence to such a recording material, the composition of the picture heat fixing device 10 of this example mentioned above reduces the nonuniformity of the temperature distribution of the fixing film 6 by the difference in paper size as compared with the former, and provides the fixing

ability power in a high throughput.
[0081]When the recording material of small size was ****(ed) by the same throughput as the recording material of large size in the image heating device which adopted the conventional fixing film, the temperature distribution nonuniformity of 60 degrees had occurred at the maximum, but. Since temperature distribution nonuniformity is low stopped in this example, a high full throughput is maintainable.
[0082]Although the example of one-side-criterion **** which brings near a recording material by direction one side of a long picture, and **** it in this example was shown, the magnetic flux shield 7 can be allocated in the non-**** region sections by the side of both ends also in the device of guide center ****, and the same effect can be acquired.
[0083]Although this example has explained 4 color color image forming device, it may use for monochrome or 1 pulse multicolor image forming device. In this case, in the fixing film 6, the elastic layer 6b is omissible.
[0084]<The example 2 of an embodiment> (drawing 7 - drawing 9)
As for the partial notch side model figure of the picture heat fixing device 10 of this example 2 of an embodiment, and drawing 8, the notch perspective view of a heating assembly and drawing 9 of drawing 7 are the lamination model figures of a fixing film.
[0085]In the anchorage device 10 of this example, the heating assembly 1, The cylindrical film guide member 3 and the iron elongated plate gold 8 with a thickness [as an induction heating element which carried out fixed allocation along with the straight side in the inner side bottom surface of this film guide member 3] of 0.7 mm, The exiting coil 4 wound around the cross section facing-down horseshoe-shaped magnetic core (ferrite core) 5 and this as a magnetic flux generation means which were allocated on this sheet metal 8, It consists of the cylindrical shape (seamless) fixing film 6A as a heat transfer member etc. which were loosely attached outside in the horseshoe-shaped magnetic core 5 at the end side of the magnetic core 5 at the insertion core 5A as a magnetic flux adjustment means in which forward/backward moving is free, and the cylindrical film guide member 3.
[0086]The electromagnetic induction febrility of the fixing film 6A in this example device is a thing of 3 lamination of the cylindrical base film 6e, the elastic layer 6b laminated to the peripheral face, and the releasing layer 6c further laminated to the peripheral face, as it is not made to provide but a lamination model figure is shown in drawing 9. This example used the 50-micrometer-thick seamless polyimide sleeve as the base film 6e, laminated 200 micrometers of silicone rubber as the elastic layer 6b to the peripheral face, and used for the peripheral face further what covered about about 20 micrometers of fluoro-resins as the releasing layer 6c. The inside diameter is made somewhat larger than the outer diameter of the cylindrical film guide member 3, and it is loosely attached outside the cylindrical film guide member 3.
[0087]The cylindrical fixing film 6A rotates an area around of the cylindrical film guide member 3 by rotation of the pressurizing roller 2 like [this example device] above-mentioned drawing 2 - the device of five.
[0088]The fixed elongated plate gold 8 as an electromagnetic induction exothermic body carries out electromagnetic induction generation of heat by the alternate magnetic flux generated by supplying an alternating current to the exiting coil 4 from the exciting circuit 40, In fixation nip part N, the fixing film 6A is heated by the generation of heat, and toner image t on the recording material P conveyed by fixation nip part N and this recording material is heated.
[0089]It can also have composition which carries out adhesion sliding of the inner surface of the fixing film 6A directly to the undersurface of the fixed elongated plate gold 8 as an electromagnetic induction exothermic body in fixation nip part N, and heats the fixing film 6A.
[0090]In order to use the cover-half heating element 8, the resin made sleeve which does not contain an electromagnetic induction exothermic layer and which is cheap and has little heat deterioration can be used for the equipment configuration of this example as the fixing film 6A.
[0091]The insertion core 5A may be a member of high magnetic permeability, and the magnetic core 5 (ferrite core) of the exiting coil 4 and the thing of same material may be sufficient as it.
[0092]According to the size of the recording material in which **** use is carried out by the driving

means 50 into the horseshoe-shaped magnetic core 5 at the end side (side which produces the non-**** region sections C) of the magnetic core 5, forward/backward moving c-d of the insertion core 5A is carried out. Although the concrete constructional example of the driving means 50 was omitted to the figure, it can design and consist of suitably and easily driving sources, such as a motor and a solenoid, and a movement mechanism using lever link cam belt rack and pinion etc.

[0093]According to the size of the recording material with which **** use of the driving means 50 is carried out, the amount of forward/backward moving of the insertion core 5A is controlled by an unillustrated control circuit.

[0094]** . When **** use of the recording material of small size is carried out, the insertion core 5A is moved into the horseshoe-shaped magnetic core 5 to the portion corresponding to the non-**** region sections C in the path of insertion c.

[0095]The alternate magnetic flux from the exiting coil 4 to the non-**** region sections C when a small size recording material is ****(ed) passes along the inside of the insertion core 5A about the direction of a long picture of fixation nip part N by this, The magnetic flux which passes along the portion corresponding to the non-**** region sections C of the fixed elongated plate gold 8 as an electromagnetic induction exothermic body can be reduced, and the calorific value of this portion can be reduced. As a result, although the small size **** region sections B in a fixation nip part serve as the optimal temperature distribution for fixing, the non-**** region sections C are falling rather than it, and prevention or relaxation of a non-paper-feed-section temperature-up phenomenon is made.

[0096]** . When **** use of the recording material of large size is carried out, the insertion core 5A is extracted out of the horseshoe-shaped magnetic core 5, and is moved in the direction d so that it may be located out of the large size **** region sections A.

[0097]The magnetic flux cover with the insertion core 5A is not made by this, but the whole region corresponding to the large size **** region sections A carries out electromagnetic induction generation of heat almost uniformly predetermined, and the fixed elongated plate gold 8 as an electromagnetic induction exothermic body serves as the optimal temperature distribution for fixing of a large size recording material.

[0098]The one to one correspondence of this composition is carried out to the width of recording material size, and since it is controllable, it can reduce the nonuniformity of temperature distribution further.

[0099]Although the example of one-side-criterion **** which brings near a recording material by direction one side of a long picture, and **** it in this example was shown, the same effect can be acquired by allocating the insertion core 5A in the non-**** region sections of both ends also in the device of guide center ****.

[0100]<The example 3 of an embodiment> (drawing 10 and drawing 11)

Drawing 10 is a partial notch side model figure of the picture heat fixing device 10 of this example 3 of an embodiment, and drawing 11 is a composition model figure of a magnetic field generating means.

[0101]The devices of this example differ in contrast with the device of above-mentioned drawing 2 - drawing 5 the point of not making the magnetic flux shields 7 and 7 providing, and in that the composition of a magnetic flux generation means is different, and other composition is the same.

[0102]That is, the magnetic flux generation means in this example device has allotted the attenuation coil 206 to the portion equivalent to the non-**** region sections C in **** use of a small size recording material. It is connected to the unillustrated load circuit via the switching element, and the terminal of the attenuation coil 206 is set up so that the signal of an image forming device may be interlocked with and load may be added.

[0103]Although the attenuation coil 206 consumes magnetic field energy in a load circuit at the time of small size ****, and the fixing film portion corresponding to the small size **** region sections B in a fixation nip part carries out electromagnetic induction generation of heat almost uniformly and serves as the optimal temperature distribution for fixing by this predetermined, Electromagnetic induction generation of heat of the fixing film portion corresponding to the non-**** region sections C is falling rather than it, and prevention or relaxation of a non-paper-feed-section temperature-up

phenomenon is made.
[0104]Although the example of one-side-criterion **** which brings near a recording material by direction one side of a long picture, and **** it in this example was shown, the same effect can be acquired by allocating the attenuation coil 206 in the non-**** region sections of both ends also in the device of guide center ****.
[0105]The attenuation coil 206 used for this composition can be used instead of making the magnetic field generating means 4 and 5 possess the above-mentioned insertion core 5A about the device using the fixed system heating element 8 of the above-mentioned example 2 (drawing 7 - drawing 9) of an embodiment. In this case, there is an advantage that the cheap fixing film 6A can be used.
[0106]It **, and according to this embodiment, the overheating of a non-paper-feed-section can be prevented and good heat-treatment can be performed. It is not necessary to have an exciting circuit different from a magnetic field generating means, and can have simple (that is, in this example, an exciting circuit is only one of the magnetic field generating means) composition especially in the composition which consumes magnetic field energy in a load circuit.
[0107]<Others> The film guide member 3 is made to attach the cylindrical fixing films 6 and 6A outside loosely like the picture heat fixing device of each of examples of an embodiment of a above, The equipment configuration which rotates the fixing films (pressurizing roller drive system) 6 and 6A by making the pressurizing roller in which fixation nip part N was made to form rotate, The slippage locomotive faculty of the film which a tension is not added to any film parts other than a fixation nip part and its neighborhood at the time of fixing film rotation (tension loess), but meets the straight side of a film guide member at the time of fixing film rotation is small. Therefore, although a means to regulate slippage movement of a film was omitted to the figure, the advantage for which means composition with an easy simple flange member etc. which receive a film end is sufficient is shown in it.
[0108]b) The fixing films 6 and 6A may be equipment configurations which carry out the **** set-up of the endless-belt-like thing between two or more members, and are rotated by driving means other than a pressurizing roller or a pressurizing roller, and, It may be an equipment configuration to which traveling transfer of the fixing films 6 and 6A of the long picture of the owner end made into the roll volume is carried out.
[0109]c) It can also be made the equipment configuration which a heating material is directly contacted to the electromagnetic induction exothermic body 8 of fixed allocation, and is heat-treated.
[0110]d) The heating apparatus of this invention not only in the picture heat fixing device of each example of an embodiment, It can be used as the means and devices which heat-treat a heating material widely, such as image heating devices, such as heating apparatus which heats the recording material which supported the picture and reforms surface nature, such as gloss, and heating apparatus which carries out assumption arrival, other stoving devices of a heating material, and a heating laminating device.
[0111]
[Effect of the Invention]As explained above, according to this invention, as heating apparatus of an electromagnetic induction heating system, The overheating in a non-paper-feed-section which is low power consumption and which can shorten waiting time is prevented, and, [in which high-durability-izing is possible] The heating apparatus having the performances, such as having the fixing defect, the gloss nonuniformity, and the high performance that offset does not generate which can be used as an anchorage device in a full color image forming device, can be obtained.

[Translation done.]